WHAT IS CLAIMED IS:

1. A frequency control apparatus comprising:

a frequency converter for receiving a signal of a first frequency modulated with a symbol representing digital information and for mixing the received signal with a second frequency different from the first frequency to convert the first frequency to a third frequency lower than the first frequency;

an oscillator for oscillating the second frequency, said oscillator being controlled to generate the second frequency in response to a control signal generated on a basis of an output of said frequency converter;

a data converter for restoring the symbol supplied from said frequency converter in conformity with modulation by which the symbol is modulated to output restored data;

a phase error operator for measuring the restored data to obtain an in-phase component and a quadrature component to the in-phase component, and using the components obtained to calculate a first phase error and a second phase error for the received signal;

an adder for summing the first and second phase errors;

a first multiplier for multiplying an output of said adder with a first coefficient; and

an integrator for integrating results of said first multiplier to generate the control signal.

2. The apparatus in accordance with claim 1, wherein said data converter comprises:

a first data converter for restoring the symbol supplied from said frequency converter in conformity with the modulation by which the symbol is modulated; and

a second data converter for delaying the symbol supplied from said frequency converter and for restoring the symbol in conformity with the modulation by which the delayed symbol is

modulated.

3. The apparatus in accordance with claim 2, wherein said second data converter delays the supplied symbol by one-half symbol interval of the supplied symbol.

4. The apparatus in accordance with claim 2, wherein said phase error operator comprises:

a first phase error operator for measuring two component signals obtained at one symbol interval of the restored data, and for using the two component signals to calculate a first phase error for the received signal; and

a second phase error operator for measuring the two component signals and delayed two component signals and for using the two component signals and the delayed two component signals to calculate a second phase error for the received signal.

5. The apparatus in accordance claim 3, wherein said phase error calculator comprises:

a first phase error operator for measuring two component signals obtained at one symbol interval of the restored data, and for using the two component signals to calculate a first phase error for the received signal; and

a second phase error operator for measuring the two component signals and delayed two component signals and for using the two component signals and the delayed two component signals to calculate a second phase error for the received signal.

6. The apparatus in accordance with claim 1, wherein said data converter restores the supplied symbol in conformity with the modulation by which the symbol is modulated at a plurality of timings at which the symbols are available.

7. The apparatus in accordance with claim 5, wherein said data converter restores the supplied symbol in conformity with the modulation by which the symbol is modulated at a plurality of timings at which the symbols are available.

8. The apparatus in accordance with claim 6, wherein said phase error operator comprises:

a third phase error operator for calculating the first phase error based on two pieces of phase information different by one symbol interval for the restored data; and

a fourth phase error operator for calculating the second phase error based on two pieces of phase information different by one-half symbol interval for the restored data.

9. The apparatus in accordance with claim 7, wherein said phase error operator comprises:

a third phase error operator for calculating the first phase error based on two pieces of phase information different by one symbol interval for the restored data; and

a fourth phase error operator for calculating the second phase error based on two pieces of phase information different by one-half symbol interval for the restored data.

10. The apparatus in accordance with claim 8, further comprising a second multiplier for multiplying the second phase error with a second coefficient for the second phase error to route a result from multiplication to said adder.

11. The apparatus in accordance with claim 9, further comprising a second multiplier for multiplying the second phase error with a second coefficient for the second phase error to route a result from multiplication to said adder.